Biomass Feedstock National User Facility

Solving feedstock challenges today

Changing the World's Energy Future

INL
Idaho National Laboratory

Biomass, waste streams and reusable carbon sources are domestically available and can be converted into power, fuel, chemicals and products. Idaho National Laboratory (INL) helps strengthen the body of knowledge that enables industry to deploy technologies capable of producing high-value products from inedible sources of biomass, wastes and reusable carbon resources. These reusable resources can include the nonrecyclable organic portions of municipal solid waste, biosolids, sludges, food waste, plastics, CO_2 and manure slurries.

At the Biomass Feedstock National User Facility (BFNUF), our researchers focus on innovative research and development (R&D) associated with key technical barriers facing the U.S. bioenergy industry. In collaboration with industry, we develop advanced feedstock supply logistics, post-harvest quality management, material handling, preprocessing,

advanced fractionation and separation technologies to produce multiple conversion-ready quality feedstocks from woody and herbaceous biomass, wastes and reusable carbon source supplies. The BFNUF Characterization Laboratory is equipped with modern analytical instruments to develop fundamental understanding of feedstock variability and critical material and quality attributes of feedstocks in support of process development efforts. Such R&D will help create intellectual property for U.S. companies, enabling them to license these technologies worldwide. The User Facility is arguably the most complete feedstock preprocessing R&D facility in the world.

Who Do We Help?
BFNUF has provided customized, technical R&D to more than a dozen leading U.S. feedstock, bioenergy and technology companies. Along

the way, BFNUF has processed more than 1,150 tons of raw materials, producing a wide variety of products from diverse sources ranging from forest and agriculture feeds to municipal solid waste.

Process Development Unit
The biomass feedstock Process Development Unit (PDU) is the flagship of the BFNUF. The PDU's innovative design—modular and reconfigurable—helps bioenergy companies find the best way to convert feedstock into fuel. The full-scale preprocessing system is located in a 27,000-square-foot high bay at INL's Energy Systems Laboratory.

The PDU can process 2 to 5 tons of raw material per hour using a variety of techniques, including sorting, segregation, feeding, hammer/knife/shear mill grinding, rotary drying, pelleting, blending, cubing and multiple packaging options. The PDU is a unique tool to accommodate the varied needs of process design and feedstock supply.

Supply Chain Development

At BFNUF, our research team combines supply and logistics experience, feedstock characterization and modeling to support collaborations in feedstock supply chain development. The BFNUF Characterization Laboratory analyzes feedstock variability, critical quality attributes and storage performance to aid development of high-quality products. Researchers evaluate the physical properties of material prior to deciding on pathways for energy conversion. Physical and chemical material evaluations are entered in the Bioenergy Feedstock Library database to provide fundamental data on feedstock characteristics for researchers and industry.

BFNUF researchers also conduct feasibility studies, techno-economic assessments, characterization of feedstock resources and supply chain designs to move the product where it needs to go. Our understanding of cost, quality and risk trade-offs helps the industry establish a successful supply chain.

Feedstock Development, Scale Up and Integration

The BFNUF is uniquely suited to help develop feedstock quality specifications because of our integrated preprocessing system, the PDU, and our in-house Characterization Laboratory.

Whether preprocessing feedstock to a customer's specifications or collaborating to develop custom specifications, BFNUF provides a complete suite of services: sourcing for common and distinctive feedstocks;

The BFNUF Characterization Laboratory analyzes feedstock characteristics and storage performance to aid customers in the development of a high-quality product.

identification of critical material and quality attributes and associated critical process parameters; development of physics-based models for flow performance prediction and validation; process development, design, testing and validation; feedstocks processed to specifications; feedstock characterization data sheets; and packaging and shipping for testing.

These capabilities allow toll processing to supply industry collaborators with quality feedstocks and fundamental knowledge, data and analytical tools for testing and validation of their conversion processes. INL researchers' experience developing these feedstocks extends to a variety of projects:

Biofuels Projects—Our PDU sorting, grinding, fractionation and drying processes produce high-fidelity feedstocks at quality specifications for feed handling and various conversion processes.

Biopower Projects—Our PDU pelleting and cubing systems supply quality feedstocks for test burns, while our pilot-scale torrefaction systems provide biopower producers an effective means to evaluate this option.

Waste-to-Energy Projects—Our PDU sorting, segregation, grinding, pelleting and cubing systems are capable of sorting and separating municipal solid waste and other reusable carbon sources for desired use and conversion processes. BFNUF's ability to characterize and inform feedstock specifications allows customers to develop custom feedstocks that improve feed handling performance, conversion performance and the capabilities of industrial-relevant preprocessing equipment design. BFNUF also offers lab- and pilot-scale testing, validation, scale-up and system integration. For the customer, this means accelerated commercialization and fewer costly delays during commissioning and startup.

For more information

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